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(FILE 'HOME' ENTERED AT 13:56:37 ON 19 MAR 1999)
FILE 'CA' ENTERED AT 13:56:41 ON 19 MAR 1999

L1 9361 S SPECIAT?
L2 36 S L1 AND ISOTOP? (2A) DILUT?
L3 4 S SIDMS
L4 164 S L1 AND SPIK?
L5 25 S L4 AND MASS SPEC?
L6 25 S L4 AND (SEDIMENT OR CLAY)
L7 75 S L2-3, L5-6

=> d 17 bib, ab 1-75

L7 ANSWER 3 OF 75 CA COPYRIGHT 1999 ACS
AN 129:320752 CA
TI Off-line separation and determination of inorganic arsenic species in natural water by high resolution inductively coupled plasma mass spectrometry with hydride generation combined with reaction of arsenic(V) and L-cysteine
AU Feng, Yong-Lai; Chen, Hong-Yuan; Tian, Li-Ching; Narasaki, Hisatake
CS Department of Chemistry, Nanjing University, Nanjing, 210093, Peop. Rep. China
SO Anal. Chim. Acta (1998), 375(1,2), 167-175 CODEN: ACACAM; ISSN: 0003-2670
LA English
AB A method is presented for the detn. of inorg. As species by hydride generation high resolu. inductively coupled plasma mass spectrometry. In the presence of 1.5 mg/mL of L-cysteine, As(V) is indirectly detd. using the difference between As(III) concns. detd. after 2 and 8 min of reaction time, whereas the As(III) concn. is obtained by taking the difference between the concn. of As(III) detd. after 8 min and the concn. of As(III) converted from As(V) after 8 min; 25 fold amts. of As(III) and 100 fold amts. of As(V) hardly affected the detn. of 1 ng/mL As(V) and 100 ng/L As(III), resp. Interferences from transition metal ions were removed using a Chelex 100 resin. The detection limits for As(III) and As(V) were 11.8 and 39.7 ng/L, resp. This method for the simultaneous detn. of inorg. As species was applied to the detn. of As(III) and As(V) in spiked and Japanese std. river water samples. Agreement within statistical uncertainty was obtained in all instances.

L7 ANSWER 4 OF 75 CA COPYRIGHT 1999 ACS
AN 129:269617 CA
TI Determination and Correction of Analytical Biases and Study on Chemical Mechanisms in the Analysis of Cr(VI) in Soil Samples Using EPA Protocols
AU Huo, Dengwei; Lu, Yusheng; Kingston, H. M.
CS Department of Chemistry and Biochemistry and the Environmental Science Program, Duquesne University, Pittsburgh, PA, 15282-1530, USA
SO Environ. Sci. Technol. (1998), 32(21), 3418-3423 CODEN: ESTHAG; ISSN: 0013-936X
LA English
AB EPA Methods 3060A (alk. extn.) and 7196A (colorimetric measurement) currently constitute a pair of protocols for the measurement of Cr(VI) in environmental soil samples in EPA RCRA SW-846 Update III. To identify the sources of possible biases, the authors applied the newly developed Speciated Isotope Diln. Mass Spectrometry (SIDMS) as an alternative detection method to Method 7196A. SIDMS is capable of correcting for species transformation, while Method 7196A is not. In Method 3060A, sol.

Cr(III) could be oxidized during extn., resulting in pos. errors of Cr(VI); Cr(VI) could be lost or reduced during neutralization, leading to neg. errors of Cr(VI). When sand and soil exts. were analyzed, low recoveries were obtained with Method 7196A. However, SIDMS achieved ~100% recoveries. The influence of some soil matrix components on the detection of Cr(VI) using Method 7196A was evaluated. As expected, reducing agents could cause low recoveries of Cr(VI). Surprisingly, strong oxidizing agents could also result in low recoveries. The authors identify these method biases and discuss the mechanisms.

L7 ANSWER 5 OF 75 CA COPYRIGHT 1999 ACS

AN 129:157746 CA

TI Method optimization and quality assurance in speciation analysis using high performance liquid chromatography with detection by inductively coupled plasma mass spectrometry

AU Larsen, Erik H.

CS Danish Veterinary and Food Administration, Institute of Food Chemistry and Nutrition, Soborg, DK-2860, Den.

SO Spectrochim. Acta, Part B (1998), 53B(2), 253-265 CODEN: SAASBH; ISSN: 0584-8547

LA English

AB A review with 23 refs. Achievement of optimum selectivity, sensitivity and robustness in speciation anal. using high performance liq. chromatog. (HPLC) with inductively coupled mass spectrometry (ICP-MS) detection requires that each instrumental component is selected and optimized with a view to the ideal operating characteristics of the entire hyphenated system. An isocratic HPLC system, which employs an aq. mobile phase with org. buffer constituents, is well suited for introduction into the ICP-MS because of the stability of the detector response and high degree of analyte sensitivity attained. Anion and cation exchange HPLC systems, which meet these requirements, were used for the sepn. of selenium and arsenic species in crude exts. of biol. samples. Furthermore, the signal-to-noise ratios obtained for these incompletely ionized elements in the argon ICP were further enhanced by a factor of four by continuously introducing carbon as methanol via the mobile phase into the ICP. Sources of error in the HPLC system (column overload), in the sample introduction system (memory by org. solvents) and in the ICP-MS (spectroscopic interferences) and their prevention are also discussed. The optimized anion and cation exchange HPLC-ICP-MS systems were used for arsenic speciation in contaminated ground water and in an inhouse shrimp ref. sample. For the purpose of verification, HPLC coupled with tandem mass spectrometry with electrospray ionization was addnl. used for arsenic speciation in the shrimp sample. With this anal. technique the HPLC retention time in combination with mass anal. of the mol. ions and their collision-induced fragments provide almost conclusive evidence of the identity of the analyte species. The speciation methods are validated by establishing a mass balance of the analytes in each fraction of the extn. procedure, by recovery of spikes and by employing and comparing independent techniques. The urgent need for ref. materials certified for elemental species is stressed.

L7 ANSWER 7 OF 75 CA COPYRIGHT 1999 ACS

AN 129:117156 CA

TI Accurate determination of element species by online coupling of chromatographic systems with ICP-MS using isotope dilution technique

AU Heumann, Klaus G.; Gallus, Stefan M.; Radlinger, Gunther; Vogl, Jochen

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University Mainz, Mainz, D-55099, Germany
SO Spectrochim. Acta, Part B (1998), 53B(2), 273-287 CODEN: SAASBH; ISSN: 0584-8547
LA English
AB The instrumental design for coupling different liq. chromatog. systems such as ion, reversed phase, and size exclusion chromatog. as well as capillary gas chromatog. with ICP-MS for the detn. of element species is described. For accurate analyses obtaining 'real time' concns. of chromatog. peaks, the isotope diln. mass spectrometric (IDMS) technique is applied. Two different spiking modes are possible, one using species-specific and another one using species-unspecific spike solns. of isotope-enriched labeled compds. The species-specific mode is only possible for element species well defined in their structure and compn., for example iodate or selenite, whereas the species-unspecific mode must be applied in all cases where the structure and compn. of the species is unknown, for example, for metal complexes with humic substances. For accurate detns. by the isotope diln. technique the mass discrimination effect must also be taken into account. Iodate, iodide and organoiodine species, including those of humic substances, were analyzed in mineral, drinking and environmental H2O samples by coupling different liq. chromatog. methods with ICP-IDMS. Heavy metal complexes with humic substances in H2O samples of different origin were characterized by size exclusion/ICP-IDMS. The possibilities of detg. different environmental Se species are discussed and the results for the anal. of selenite and selenate, which was carried out by GC/ICP-IDMS after converting these species into a volatile piasselenol compd., are presented.

L7 ANSWER 8 OF 75 CA COPYRIGHT 1999 ACS
AN 129:71836 CA
TI Accuracy in species analysis: speciated isotope dilution mass spectrometry (SIDMS) exemplified by the evaluation of chromium species
AU Kingston, H. M.; Huo, Dengwei; Lu, Yusheng; Chalk, Stuart
CS Department of Chemistry and Biochemistry, Duquesne University, Pittsburgh, PA, 15282, USA
SO Spectrochim. Acta, Part B (1998), 53B(2), 299-309 CODEN: SAASBH; ISSN: 0584-8547
LA English
AB Speciated isotope diln. mass spectrometry (SIDMS) improves accuracy in the detn. of chem. species in samples. It can be used to measure elements in their oxidn. states as well as in organometallics or other mol. forms of species. SIDMS compensates for species transformations that occur in many of the steps of sample processing, including sampling process, storage, sample prepn. and speciated measurement. It is also a diagnostic tool for identifying the most error prone steps. These combined capabilities provide a new method for establishing std., legally defensible measurement tool in speciation anal. Early speciation studies of Cr(VI) and Cr(III) demonstrate the unique advantages of SIDMS. Thus far, SIDMS has cor. $\leq 80\%$ of the redn. of Cr(VI) to Cr(III). In theory, using SIDMS makes it possible to correct $\leq 90\%$ species conversion with good precision. This paper describes how to apply the method to Cr and provides examples of the general steps.

L7 ANSWER 9 OF 75 CA COPYRIGHT 1999 ACS
AN 129:71835 CA
TI Lead speciation in rainwater by isotope dilution-high performance liquid chromatography-inductively coupled plasma-mass spectrometry
AU Ebdon, Les; Hill, Steve J.; Rivas, Cristina

CS Plymouth Analytical Chemistry Research Unit, Department of Environmental
Sciences, University of Plymouth, Plymouth, PL4 8AA, UK

SO Spectrochim. Acta, Part B (1998), 53B(2), 289-297 CODEN: SAASBH; ISSN:
0584-8547

LA English

AB A method for Pb speciation in rainwater by isotope diln. anal. (IDA) using
directly coupled HPLC-inductively coupled plasma-mass spectrometry (HPLC-
ICP-MS) is described and demonstrated. Samples contg. trimethyllead (TML)
chloride and triethyllead (TEL) chloride in the presence of large amts. of
inorg. Pb were analyzed by HPLC-ICP-MS using reverse phase ion-pairing
chromatog. The detection limit for the procedure is 3 ng/g for TML as Pb
and 14 ng/g for TEL as Pb, with a linear range exceeding 1000 ng/g and a
relative std. deviation of 4% for TML in the range 50-1000 ng/g. TML
chloride isotopically enriched in the stable 206 isotope was prepd. and
used to enhance the accuracy of the method by isotope diln. anal. The
IDA-HPLC-ICP-MS method was applied to the anal. of a sample of artificial
rainwater used in a collaborative study.

L7 ANSWER 13 OF 75 CA COPYRIGHT 1999 ACS

AN 128:187996 CA

TI Substoichiometric separation and isotope dilution mass spectrometry of
iron(III) based on the synergistic extraction with 4-isopropyltropolone
and 3,5-dichlorophenol

AU Imura, Hisanori; Sakamoto, Hideyuki; Ohashi, Kousaburo; Shirasaki,
Toshihiro; Okumoto, Toyoharu

CS Department of Environmental Sciences, Faculty of Science, Ibaraki
University, Mito, 310, Japan

SO Anal. Sci. (1997), 13(Suppl., Asianalysis IV), 11-12 CODEN: ANSCEN;
ISSN: 0910-6340

LA English

AB Substoichiometric isotope diln. mass spectrometry (SIDMS) as a new anal.
method is proposed for the accurate detn. of Fe. Fe(III) was extd. with a
substoichiometric amt. of 4-isopropyltropolone (Hipt) in xylene or heptane
in the presence of 3,5-dichlorophenol (DCP) as a synergist and then
subjected to the isotope measurement (^{54}Fe) with a microwave-induced
plasma mass spectrometer. For more precise detn., ^{59}Co was used as an
internal std. In this method, the correction of the mass discrimination
of isotope measurement is not required and the use of expensive enriched
stable isotopes can be avoided.

L7 ANSWER 14 OF 75 CA COPYRIGHT 1999 ACS

AN 128:187968 CA

TI Simultaneous speciation of redox species of arsenic and selenium using an
anion-exchange microbore column coupled with a micro-concentric nebulizer
and an inductively coupled plasma mass spectrometer as detector

AU Woller, Agnes; Garraud, Herve; Boisson, Jolanda; Dorthé, Anne Marie;
Fodor, Peter; Donard, Olivier F. X.

CS Department of Chemistry and Biochemistry, University of Horticulture and
Food Industry, Budapest, 1114, Hung.

SO J. Anal. At. Spectrom. (1998), 13(2), 141-149 CODEN: JASPE2; ISSN:
0267-9477

LA English

AB Speciation methods for trace metals in the environment need rapid and
accurate analyses. The simultaneous detn. of redox species of As (AsIII
and AsV) and Se (SeIV and SeVI) was carried out by coupling a microbore
column with a micro-concentric nebulizer (MCN) and inductively coupled
plasma mass spectrometry (ICP-MS). The MCN, with its ability to nebulize

liqs. at low flow rates, was adapted to a small bore (2 mm id) microbore anion-exchange column. After optimizing the parameters of the MCN by factorial exptl. design, an evaluation of the sepn. of redox As and Se species was carried out. The method was applied to the detn. of the four species in a sample recommended for Se speciation studies, in a spiked natural H₂O and in polluted soil leachings. No interference of ⁴⁰Ar³⁵Cl on ⁷⁵As was obsd. when natural H₂O samples were analyzed. The method showed good accuracy and repeatability in addn. to facile handling and development. A detection limit of 1 ng ml⁻¹ was found for the As species and 4 ng ml⁻¹ for the Se species.

L7 ANSWER 17 OF 75 CA COPYRIGHT 1999 ACS

AN 128:3070 CA

TI Speciation of arsenic animal feed additives by microbore high-performance liquid chromatography with inductively coupled plasma mass spectrometry
AU Pergantis, Spiros A.; Heithmar, Edward M.; Hinnens, Thomas A.

CS Environmental Sciences Division, US Environmental Protection Agency, National Exposure Research Laboratory, Las Vegas, NV, 89193-3478, USA

SO Analyst (Cambridge, U. K.) (1997), 122(10), 1063-1068 CODEN: ANALAO; ISSN: 0003-2654

LA English

AB Phenylarsonic compds. have been used as poultry and swine feed additives for the purpose of growth promotion and disease prevention. Owing to the lack of suitable anal. methods, however, knowledge of their metab., environmental fate and impact remains incomplete. In order to compensate for this, anal. procedures were developed that allow the speciation of arsenic animal feed additives by using microbore high-performance liq. chromatog. (μ HPLC) coupled online with ICP-MS. More specifically, reversed-phase (RP) chromatog. methods were optimized to achieve the sepn. of various phenylarsonic acids from each other and from the more toxic inorg. arsenic compds. This mode of chromatog., however, exhibits limitations, esp. in the presence of naturally occurring organoarsenic compds. The application of RP ion-pairing chromatog. eliminates such shortcomings by minimizing the co-elution of arsenic species. In general, the μ HPLC-ICP-MS methods developed in this study provide high selectivity, extremely good sensitivity, low limits of detection (low-ppb or sub-pg amts. of As), require small sample vols. ($< 1 \mu$ l), minimize waste and operate most efficiently under low mobile-phase flow rates (15-40 μ l min⁻¹), which are compatible for use with other types of mass spectrometers, e.g., electrospray. Ref. materials contg. naturally occurring arsenic compds. were spiked with phenylarsonic compds. and then analyzed by using the procedures developed in this study.

L7 ANSWER 18 OF 75 CA COPYRIGHT 1999 ACS

AN 127:341145 CA

TI Substoichiometric isotope dilution mass spectrometry as a new analytical method

AU Imura, H.; Sakamoto, H.; Ohashi, K.; Shirasaki, T.; Oishi, K.

CS Fac. Science, Ibaraki Univ., Mito, 310, Japan

SO J. Radioanal. Nucl. Chem. (1997), 220(2), 191-193 CODEN: JRNCMD; ISSN: 0236-5731

LA English

AB A novel anal. method, the substoichiometric isotope diln. mass spectrometry (SIDMS) is proposed. This method consists of the substoichiometric sepn. of the element in question and the subsequent intensity measurement of a stable isotope of the element with a mass spectrometer. In SIDMS, the correction of the mass discrimination of

isotope measurement is not necessary and the use of expensive enriched stable isotopes may be avoided. The validity and the usefulness of SIDMS are demonstrated by the substoichiometric extn. of Fe³⁺ with 4-isopropyltropolone and 3,5-dichlorophenol following microwave-induced plasma mass spectrometry.

L7 ANSWER 19 OF 75 CA COPYRIGHT 1999 ACS

AN 127:190050 CA

TI Comparison of XANES analyses and extractions to determine chromium speciation in contaminated soils

AU Szulczewski, Melanie D.; Helmke, Philip A.; Bleam, William F.

CS Department of Soil Science, University of Wisconsin, Madison, WI, 53706, USA

SO Environ. Sci. Technol. (1997), 31(10), 2954-2959 CODEN: ESTHAG; ISSN: 0013-936X

LA English

AB Chromium-contaminated soils from three sites in Wisconsin were analyzed for the total concn. of chromium, with neutron activation anal., extractable Cr(VI) using a typical phosphate buffer and exchangeable Cr(VI) with isotope diln. anal. X-ray absorption near-edge structure (XANES) spectroscopy provided a phys. method for detg. the ratio of Cr(VI):Cr(III) in the contaminated soils. In most samples, <10% of the total Cr was present as Cr(VI). Of the total Cr(VI) measured with XANES anal., only a fraction was isotopically exchangeable, and an even smaller fraction of the total Cr(VI) was extd. with a phosphate buffer. The speciation and extn. of chromium in actual contaminated soils are more complex than traditional chem. methods can show.

L7 ANSWER 20 OF 75 CA COPYRIGHT 1999 ACS

AN 127:139782 CA

TI Chromium speciation analysis in soils/sediments - zero percent matrix spike recoveries may not equal unreliable data

AU Vitale, Rock J.; Mussoline, George R.; Rinehimer, Kelly A.

CS Environmental Standards, Inc., Valley Forge, PA, USA

SO Contam. Soils (1996), 1, 221-229 CODEN: CNSLF5

LA English

AB SW-846 Method 3060A, an alk. digestion procedure to det. Cr⁶⁺ in soils, has been documented to be an effective technique to det. sol. and insol. forms of Cr⁶⁺ (B.R. James, et.al., 1995; R.J. Vitale, et.al., 1995a). In certain soils/sediments with highly reducing properties, Cr exists exclusively as the Cr³⁺ species. Matrix spiking of such soils/sediments with Cr⁶⁺ is predicted to yield 0% recovery. Traditionally such recoveries would have been interpreted as an indication that the resultant data are unreliable. Hence, when such recoveries are obsd., it is crit. to det. the sample redox characterization so quality control information can be correctly interpreted. A discussion and interpretation of actual field sample Cr⁶⁺ quality control data using redox indicators as applied to SW-846 Method 3060A is presented. It was concluded that 0 or low pre-digestion matrix spike recoveries do not necessarily mean data obtained are unreliable. Ancillary parameter data must be evaluated to det. if the sample type is reducing in nature and cannot support Cr⁶⁺, either in the natural environment or after being spiked into a sample in the lab. If reducing conditions are obsd. (high total org. C, BOD, COD, and/or S₂-concns., acidic pH, neg. oxidn./redn. potential), and other quality control samples such as lab. control samples (blank spikes) are acceptable, then the data should be viewed as acceptable for use.

L7 ANSWER 22 OF 75 CA COPYRIGHT 1999 ACS
 AN 127:55396 CA
 TI Speciation of spiked rare earth element La in sediments and its bioavailability
 AU Wang, Qin; Sun, Hao; Wang, Xiarong; Wang, Liansheng
 CS State Key Lab. Pollution Control Resources Reuse, Dep. Environmental Sciences Engineering, Nanjing University, Nanjing, 210093, Peop. Rep. China
 SO Huanjing Huaxue (1997), 16(2), 109-111 CODEN: HUHADB; ISSN: 0254-6108
 LA Chinese
 AB Three La species: water-sol., acid extractable, and org.- and sulfate-bound, of spiked rare earth element lanthanum in sediment were studied, and the correlation to the bioavailability for algae (*Chlorella Vulgaris* Beijerinck) were also established by linear regression. The results indicate that there are good correlation between the concn. of La in algae and the concns. of three species in sediments. resp. Among three species, the sol. species has the highest bioavailability to algae, this suggests that the release of REE La from the sediment is the most important factor affect the bioavailability of La algae.

L7 ANSWER 23 OF 75 CA COPYRIGHT 1999 ACS
 AN 126:333585 CA
 TI Cr(III)/Cr(VI) speciation in aerosol particles by extractive separation and thermal ionization isotope dilution mass spectrometry
 AU Nusko, R.; Heumann, K. G.
 CS Institute Inorganic Analytical Chemistry, Johannes Gutenberg-University, Mainz, D-55099, Germany
 SO Fresenius' J. Anal. Chem. (1997), 357(8), 1050-1055 CODEN: FJACES; ISSN: 0937-0633
 LA English
 AB An isotope diln. mass spectrometric (IDMS) method, using the formation of pos. thermal ions, was developed for Cr(III) and Cr(VI) speciation in aerosol particles. Cr(III) and Cr(VI) spike species, enriched in ⁵³Cr, were applied for the isotope diln. step. After leaching of filter-collected aerosol samples by an alk. soln. at pH 13, species sepn. was carried out by extn. with a liq. anion exchanger in Me iso-Bu ketone. Cr(VI) in the org. phase was re-extd. into an ammoniacal soln., and Cr was then isolated from both fractions of species by electrodeposition. Detection limits of 30 pg/m³ for Cr(III) and of 8 pg/m³ for Cr(VI) were achieved in atm. aerosols for vols. of air samples of ≈120 m³. These low detection limits allowed the detn. of Cr species in continental aerosol particles in relation to different seasons. The Cr(III)/Cr(VI) ratio was always ≈0.3, whereas dust from soil erosion, which is probably the primary source of Cr in the atm., showed higher ratios. This indicates that Cr is oxidized in the atm. The accuracy of the method was demonstrated in 2 interlab. comparisons of Cr(VI) detns. in welding dust samples. The IDMS method also contributed to the certification of a corresponding std. ref. material organized by the Std. Ref. Bureau of the European Union. Cr speciation, including the detn. of elemental Cr(0), was carried out in aerosols of different welding processes for stainless steel. These analyses showed distinct differences in the distribution of Cr species in the welding process and can be used as an exact calibration method for routine methods in this important field of monitoring corresponding workplaces.

L7 ANSWER 24 OF 75 CA COPYRIGHT 1999 ACS
 AN 126:320797 CA

TI Determination of Iridium in Natural Waters by Clean Chemical Extraction and Negative Thermal Ionization Mass Spectrometry
 AU Anbar, A. D.; Papanastassiou, D. A.; Wasserburg, G. J.
 CS Lunatic Asylum of the Charles Arms Laboratory Division of Geological and Planetary Science, California Institute of Technology, Pasadena, CA, 91125, USA
 SO Anal. Chem. (1997), 69(13), 2444-2450 CODEN: ANCHAM; ISSN: 0003-2700
 LA English
 AB Methods for precise, routine measurement of Ir in seawater, river water, and estuarine water using isotope diln. neg. thermal ionization mass spectrometry (ID-NTIMS) were developed. After equilibration with a ^{191}Ir -enriched spike, Ir is sepd. from soln. by copptn. with ferric hydroxide, followed by anion exchange chromatog. using a reductive elution technique. UV irradiation is used to decomp. trace orgs. which interfere with neg. ion prodn. IrO_2^- ions are produced in the mass spectrometer by heating the sample on a Ni-wire filament in the presence of $\text{Ba}(\text{OH})_2$. Detection efficiencies were 0.1-0.3%. These procedures were used to det. Ir in 4 kg samples from the Pacific and Atlantic oceans and the Baltic Sea. These chem. procedures introduce a total blank of $\sim 2 \times 10^8$ atoms/sample. Ir distribution in the oceans is fairly uniform, averaging $\sim 4 \times 10^8$ atoms/kg. Concns. in the rivers supplying the Baltic Sea were $(17.4 \pm 0.9) \times 10^8$ and $(92.9 \pm 2.2) \times 10^8$ atoms/kg for a pristine and polluted river, resp. Ir distribution, speciation, and transport in natural waters can now be subjected to intensive study.

L7 ANSWER 30 OF 75 CA COPYRIGHT 1999 ACS
 AN 125:315503 CA
 TI Development of a gas chromatography inductively coupled plasma isotope dilution mass spectrometry system for accurate determination of volatile element species. Part 1. Selenium speciation
 AU Gallus, Stefan M.; Heumann, Klaus G.
 CS Inst. Inorganic Analytical Chem., Johannes Gutenberg-Univ., Mainz, D-55099, Germany
 SO J. Anal. At. Spectrom. (1996), 11(9), 887-892 CODEN: JASPE2; ISSN: 0267-9477
 LA English
 AB The detn. of element species in the environment is often esp. difficult due to their presence at low concns. The coupling of GC with ICP-MS offers the advantage of transferring the total analyte into the ICP-MS instrument without any loss of analyte by nebulization. The application of IDMS results in relatively accurate results. The described GC-ICP-IDMS system consists of a gas chromatograph fitted with a capillary column, for anal. sepn., and a diffusion cell that is used to exactly det. the mass discrimination factor for the isotope ratio measurement and to perform an element specific optimization of the plasma conditions. The construction of a relatively simple and low cost transfer line as well as the interface between GC and ICP-MS is described in detail. The applicability of the developed GC-ICP-IDMS system for the detn. of volatile element species is demonstrated by the detn. of selenite. Selenite is converted into a volatile selenol prior to detn. Selenate is detd. after conversion into selenite. By applying 62% enriched ^{82}Se selenite spike soln. for the isotope diln. step, the $^{77}\text{Se}:^{82}\text{Se}$ and $^{78}\text{Se}:^{82}\text{Se}$ ratios, resp., could be used for content calcn. Selenite (10 ng mL^{-1}) was detd. in a water sample with good agreement (within 1%) between the results obtained using the two isotope ratios. The accuracy of the results was demonstrated by the anal. of std. ref. materials. The detection limit of the described method was found to be 0.02 ng mL^{-1} .

L7 ANSWER 33 OF 75 CA COPYRIGHT 1999 ACS
AN 124:65859 CA
TI Evaluation of metal fractions in river sediments and waters: application of chelation chromatography-differential pulse anodic stripping voltammetry
AU Sundd, S.; Prasad, B. B.
CS Fac. Sci., Banaras Hindu Univ., Varanasi, 221 005, India
SO Talanta (1995), 42(10), 1395-409 CODEN: TLNTA2; ISSN: 0039-9140
LA English
AB The ability of chelation chromatog. in combination with differential pulse anodic stripping voltammetry (DPASV) to provide a simple, fast and reliable way of dealing with interionic interferences, competitive complexations, re-adsorption of released metal ions and sorption of spiking metal ions by org./inorg. materials in the complex matrixes of real natural samples has been critically examd. The technique is based on the selective complexation of target metal fractions on some novel sorbents which are polymeric chelating resins doped on stationary supports (Whatman No. 1 paper and silica gel). The usual complications of leaching of the resin and/or the chelating ligand and colloid retention on the sorption bed at any stage of sepn. were largely obviated with these sorbents under the operational conditions of metal sorption. A detailed study on the application of such sorbents to the differentiation of ionic (free), labile (ionic plus weakly complexed) and bound (strongly complexed) metal fractions present in local river-sediment and water samples was carried out. Chelating resin-impregnated paper (CRIP) and chelating resin-immobilized silica gel column (CRISC) methods of chromatog. sepn. of analyte trace metals in combination with the follow-up 'std. addn.' procedure of the DPASV technique were employed. A modest attempt has been made to formulate a speciation (fractionation) scheme for metal contents present in river-sediments and waters on the basis of selective retention of ionic and labile fractions on complexing resins.

L7 ANSWER 34 OF 75 CA COPYRIGHT 1999 ACS
AN 123:264623 CA
TI Iodine speciation in size fractionated atmospheric particles by isotope dilution mass spectrometry
AU Wimschneider, Andrea; Heumann, Klaus G.
CS Inst. Anorganische Chemie, Univ. Regensburg, Regensburg, D-93040, Germany
SO Fresenius' J. Anal. Chem. (1995), 353(2), 191-6 CODEN: FJACES; ISSN: 0937-0633
LA English
AB An isotope diln. mass spectrometric method has been developed for the accurate and sensitive detn. of I- and IO3- in atm. aerosol particulates. The direct I speciation has been possible by the use of species, specifically 129I enriched spike solns. and sepn. of the isotope dild. species by anion exchange chromatog. after water extn. of the filters. Size fractionated collection of aerosol particles by a six stage impactor system shows different distributions of I- and IO3- for particles of different size with specific patterns for anthropogenically influenced continental and unpolluted marine aerosols, resp. The detection limit for particulate I- and IO3- has been (3-5) pg/m3 for sampling vols. of 3000 m3. Oil used for heating plants could be identified as one but not the only anthropogenic I source.

L7 ANSWER 35 OF 75 CA COPYRIGHT 1999 ACS
AN 123:217042 CA

TI Recent developments in thermal ionization mass spectrometric techniques for isotope analysis
 AU Heumann, K. G.; Eisenhut, S.; Gallus, S.; Hebeda, E. H.; Nusko, R.; Vengosh, A.; Walczyk, T.
 CS Institut fuer Anorganische Chemie der Universitaet Regensburg, Regensburg, D-93040, Germany
 SO Analyst (Cambridge, U. K.) (1995), 120(5), 1291-9 CODEN: ANALAO; ISSN: 0003-2654
 LA English
 AB A review with 62 refs. Thermal ionization mass spectrometry in the pos. or neg. ionization mode can be used for precise isotope ratio detns. of most elements. The preferably formed ions are M⁺, M⁻ and MO_x⁻ (x = 1-4). Recent interesting developments in this field, which are relevant in geol., are the U/Th and Re/Os dating methods, re-detns. of the relative at. masses of elements by more precise and more accurate isotope ratio measurements, the detn. of isotope variations in geol. and cosmic samples and the anal. of trace and ultra-trace amts. of elements and elemental species in the environment. To measure accurately a low abundant isotope in addn. to a high abundant isotope (up to ratios of 10⁹), thermal ionization mass spectrometers with deceleration lens systems were constructed which fulfill the required abundance sensitivities. Cr (III)/Cr(VI) speciation below the µg L⁻¹ level in different river water samples is reported as an example of the application of pos. thermal ionization mass spectrometry in connection with the isotope diln. technique. Re/Os detns. in Fe meteorites of Group IIA and IAB are performed by using a corresponding sepn. procedure with an OsO₄ distn. step and Re isolation by anion-exchange chromatog. The isochron for the IIA Fe meteorites results in an age of (4.54 ± 0.08) × 10⁹ years. These precise measurements also indicate small deviations of the IAB silicate-rich Fe meteorite data from the IIA isochron. Precise B isotope ratio measurements by neg. thermal ionization mass spectrometry are applied to det. anthropogenic influences in groundwater samples.

L7 ANSWER 36 OF 75 CA COPYRIGHT 1999 ACS
 AN 123:159568 CA
 TI High performance liquid chromatography-isotope dilution-inductively coupled plasma-mass spectrometry for lead and tin speciation in environmental samples
 AU Hill, S. J.; Brown, A.; Rivas, C.; Sparkes, S.; Ebdon, L.
 CS Department Environmental Sciences, University Plymouth, Plymouth, PL4 8AA, UK
 SO Tech. Instrum. Anal. Chem. (1995), 17, 411-34 CODEN: TIACD4; ISSN: 0167-9244
 LA English
 AB Overview of speciation methods for lead and tin, isotope diln. in HPLC-ICP-MS, coupling HPLC to ICP-MS, potential problems with gradient elution HPLC-ICP-MS, organometallic calibrants for isotope diln. anal., prepn. of enriched lead and tin isotope calibrants, data processing in HPLC-ICP-MS and isotope diln.-HPLC-ICP-MS, and detn. of trimethyllead by HPLC-ICP-MS in rainwater are discussed.

L7 ANSWER 37 OF 75 CA COPYRIGHT 1999 ACS
 AN 123:24904 CA
 TI Method of speciated isotope dilution mass spectrometry
 IN Kingston, Howard M.
 PA Duquesne University of the Holy Ghost, USA
 SO U.S., 11 pp. CODEN: USXXAM

PI US 5414259 A 19950509
AI US 94-177783 19940105
LA English
AB

The method of detg. the concn. of a specie in a sample includes providing at least one predetd., enriched isotope in the same speciated form as the species to be measured, spiking the sample contg. the species to be measured, equilibrating the spiked species with the species to be measured, sepg. the species from the sample and subsequently detg. the concn. of the species to be measured by employing isotopic element specie ratios. In one embodiment, a single speciated isotope spike is employed and, in others, two or more such spikes may be employed. In a preferred embodiment, time resoln. chromatog. is used to effect sepn. of these species from the sample and mass spectrometer is employed in detg. isotopic elemental ratios. It is also preferred that a method be employed to det. if there was conversion from one species to another. In another embodiment, spiking of the several different isotopically enriched analogs of the same specie are added at various steps in the sampling procedure and the stability and integrity of the specie with respect to these processes is evaluated by mass spectrometric measurements of the various isotopic ratios. Chem. processes, extn. methods, dissoln. procedures and storage procedures are evaluated. In another embodiment, speciated isotope diln. is used to det. the effect on species of various sample prepn. methods and portions of sample prepn. techniques. Extn. and sepn. procedures employ the technique to provide definitive evidence of accurate specie manipulation and provide for performance based measurement.

L7 ANSWER 40 OF 75 CA COPYRIGHT 1999 ACS
AN 122:122085 CA

TI Elemental speciation with liquid chromatography-inductively coupled plasma isotope dilution mass spectrometry
AU Heumann, Klaus G.; Rottmann, L.; Vogl, J.
CS Inst. Inorg. Chem., Univ. Regensburg, Regensburg, D-93040, Germany
SO J. Anal. At. Spectrom. (1994), 9(12), 1351-5 CODEN: JASPE2; ISSN: 0267-9477

LA English

AB For the detn. of elemental species, which normally exist at low concns. in the environment, coupling of liq. chromatog. systems with inductively coupled plasma mass spectrometry (ICP-MS) is a powerful method with respect to detection limit. However, accurate results are still a problem in trace analyses but can be obtained by the application of isotope diln. mass spectrometry (IDMS). The developed LC-ICP-IDMS system consists of a HPLC pump, a sample injection valve, a sepn. column (different types of chromatog. sepn. systems, e.g., ion or size-exclusion chromatog., were used depending on the sepn. problem), a nondestructive detector (e.g. a UV detector) for simultaneous detn. of org. substances, and an element-specific ICP mass spectrometer. Isotope diln. is carried out by adding an isotopically enriched species-specific spike soln. to the sample prior to the sepn. step in the case of the detn. of well-defined species, or by continuous online introduction of a species-specific spiking method is demonstrated for the detn. of iodide and iodate in mineral H₂O using an ion chromatog. sepn. column. For example, iodate concns. at 0.5-20 ng mL⁻¹ could be detd. with relative std. deviations of ~2%. The species-unspecific spiking mode was used to det. heavy metal complexes with humic substances at a level of ~1 ng mL⁻¹ as well as organo-I species in the concn. range 0.7-1.4 ng mL⁻¹ in natural H₂O systems. The accuracy of speciation could be verified by comparing the total element concn. with the sum of the different elemental species.

L7 ANSWER 43 OF 75 CA COPYRIGHT 1999 ACS
AN 120:234969 CA
TI Development of a coupled liquid chromatography - isotope dilution
inductively coupled plasma mass spectrometry method for lead speciation
AU Brown, Alistair A.; Ebdon, Les; Hill, Steve J.
CS Plymouth Analytical Chemistry Research Unit, Department of Environmental
Sciences, University of Plymouth, Drake Circus, Plymouth, PL4 8AA, UK
SO Anal. Chim. Acta (1994), 286(3), 391-9 CODEN: ACACAM; ISSN: 0003-2670
LA English
AB A method has been developed for lead speciation using liq. chromatog. with
isotope diln. inductively coupled plasma mass spectrometry (LC-ID-ICP-MS).
Inorg. lead (Pb²⁺), trimethyllead (Me₃Pb⁺) and triethyllead (Et₃Pb⁺) were
sepd. on a 5- μ m Hypersil ODS column using a programmed gradient of 10 : 90
to 30 : 70 methanol-buffer eluent. The buffer was prepd. by mixing equal
amts. of 0.1 mol L⁻¹ sodium acetate and acetic acid each contg. 4 mmol L⁻¹
sodium pentanesulfonic acid. To minimize the dead vol. of the interface a
single pass 40 mL vol. spray chamber with a concentric glass nebulizer was
used to coupled the LC and ICP-MS. Best precision isotope ratio
measurements were obtained with peak jumping and short dwell times (80
 μ s). The overall detection limit (3 σ) for trimethyllead ions was 0.48 ng
g⁻¹ as lead.

L7 ANSWER 45 OF 75 CA COPYRIGHT 1999 ACS
AN 120:199958 CA
TI Chromium speciation with isotope dilution mass spectrometry
AU Nusko, Robert; Heumann, Klaus G.
CS Institut fuer Anorganische Chemie, Universitaet Regensburg,
Universitaetsstrasse 31, D-93040, Regensburg, Germany
SO Anal. Chim. Acta (1994), 286(3), 283-90 CODEN: ACACAM; ISSN: 0003-2670
LA English
AB Cr(III) and Cr(VI) were detd. by pos. thermal ionization isotope diln.
mass spectrometry (IDMS). From the spiked samples, Cr(VI) was sepd. from
Cr(III) by extn. with the liq. anion exchanger Amberlite LA-2. Re-extn.
of Cr(VI) was performed with an NH₄OH soln. After electrolytic deposition
of Cr from both species the isotope ratio ⁵²Cr/⁵³Cr was detd. Detection
limits of 1.2 ng/g for Cr(III) and of 2.4 ng/g for Cr(VI), resp., were
achieved. A HCO₃⁻/CO₂ buffer soln. of pH 6.4 contg. Cr(III) and Cr(VI)
enriched in ⁵³Cr was used as spike soln. The stability of the Cr species
in this soln. was tested in model expts. with labeled radioactive ⁵¹Cr.
The accuracy of the IDMS method could be shown in two interlab.
comparisons. Several fresh and treated wastewater samples with Cr(III)
concns. in the range of 2-55 ng/g and Cr(VI) concns. of <2.4 ng/g were
analyzed. The results of the freshwater samples could be explained by the
known geochem. behavior of Cr in natural water systems.

L7 ANSWER 48 OF 75 CA COPYRIGHT 1999 ACS
AN 117:263682 CA
TI Isotope dilution mass spectrometry
AU Heumann, Klaus G.
CS Inst. Anorg. Chem., Univ. Regensburg, Regensburg, W-8400, Germany
SO Int. J. Mass Spectrom. Ion Processes (1992), 118-119, 575-92 CODEN:
IJMPDN; ISSN: 0168-1176
LA English
AB A review with 69 refs. In the past isotope diln. mass spectrometry (IDMS)
has usually been applied using the formation of pos. thermal ions of
metals. Esp. in calibrating other anal. methods and for the certification

of std. ref. materials this type of IDMS became a routine method. Today, the progress in this field lies in the detn. of ultra trace amts. of elements, e.g. of heavy metals in Antarctic ice and in aerosols in remote areas down to the sub-pg g-1 and sub-pg m-3 levels, resp., in the anal. of U and Th at concns. of a few pg g-1 in sputter targets for the prodn. of microelectronic devices or in the detn. of sub-picogram amts. of ^{230}Th in corals for geochem. age detns. and of ^{226}Ra in rock samples. During the last few years neg. thermal ionization IDMS has become a frequently used method. The detn. of very small amts. of Se and Tc as well as of other transition metals such as V, Cr, Mo and W are important examples in this field. Also the measurement of Si in connection with a redetn. of Avogadro's no. and Os analyses for geol. age detns. by the Re/Os method are of special interest. Inductively-coupled plasma mass spectrometry is increasingly being used for multielement analyses by the isotope diln. technique. Detns. of heavy metals in samples of marine origin are representative examples for this type of multielement anal. by IDMS. Gas chromatog.-mass spectrometry systems were successfully applied after chelation of metals (for example Pt detn. in clin. samples) or for the detn. of volatile element species in the environment, e.g. di-Me sulfide. However, IDMS - esp. at low concn. levels in the environment - seems likely to be one of the most powerful anal. methods for speciation in the future. This was shown, for species of I, Se and some heavy metals in aquatic systems.

L7 ANSWER 53 OF 75 CA COPYRIGHT 1999 ACS

AN 116:200567 CA

TI Cobalt(II) interactions with near-coastal marine sediments

AU Hansen, A. M.; Leckie, J. O.; Mee, L. D.

CS Inst. Cienc. Nucl., Univ. Nac. Auton. Mexico, Mex.

SO Environ. Geol. Water Sci. (1992), 19(2), 97-111 CODEN: EGWSEI; ISSN: 0177-5146

LA English

AB Chem. speciation of trace metals in aq. systems is detd. by a variety of competitive reactions. Sediments act as sinks for many trace elements, forming surface complexes and otherwise surface-related compds. Reactions between dissolved trace metals and functional groups at sediment surfaces can be described as coordination reactions similar to those occurring in soln. Factors inherent to both sediment and soln. influence the trace metal speciation. These factors include pH, type of mineral, surface area and/or d. of reactive surface sites, complexing ligands, and competing ions. The relative importance of some of these factors was studied using an isotope diln. technique. Coastal sediment samples from the Gulf of Mexico were used as the solid matrix. Models developed for pure minerals were used to (empirically) describe the complex assemblages of minerals in the natural sediment samples. The adsorption expts. showed that Co uptake by marine sediment samples followed a 2-step time dependency. The initial fast step lasted about 5-10 days and the subsequent slow step continued after >100 days of equilibration. The pseudoequil. reached during the fast step was modeled with an equil. model, while the 2-step behavior was modeled with a time-dependent model. The 2 models are related by the reaction stoichiometries. It is believed that the exptl. as well as the modeling approach taken in this study, although empirical when used for natural settings, is much more powerful than the use of traditional means to describe trace element interactions with natural solid phases.

L7 ANSWER 54 OF 75 CA COPYRIGHT 1999 ACS

AN 116:17938 CA

TI Isotope dilution/inductively coupled plasma mass spectrometric determination of total tin in NIES fish tissue reference material
 AU Okamoto, K.
 CS Div. Chem. Phys., Natl. Inst. Environ. Stud., Tsukuba, 305, Japan
 SO Spectrochim. Acta, Part B (1991), 46B(12), 1615-22 CODEN: SAASBH; ISSN: 0584-8547
 LA English
 AB The Nat. Inst. for Environmental Studies has recently undertaken the prepn. of fish tissue ref. material for use in the speciation of total tin, tributyltin, and triphenyltin. Isotope-diln./inductively coupled plasma mass spectrometry (ICP-MS) was used for the detn. of trace levels of total tin in fish tissue and other biol. ref. materials. The isotope-diln./ICP-MS showed high accuracy and precision, thus the use of this anal. technique was indispensable in the certification process of total tin in the fish tissue ref. material. Anal. procedures for the isotope diln. anal. and certification procedures based on collaborative anal. are described.

L7 ANSWER 56 OF 75 CA COPYRIGHT 1999 ACS
 AN 115:119693 CA
 TI Determination of dissolved selenium species in environmental water samples using isotope dilution mass spectrometry
 AU Tanzer, Dieter; Heumann, Klaus G.
 CS Inst. Anorg. Chem., Univ. Regensburg, Regensburg, D-8400, Fed. Rep. Ger.
 SO Anal. Chem. (1991), 63(18), 1984-9 CODEN: ANCHAM; ISSN: 0003-2700
 LA English
 AB In order to clarify the species compn. of Se in environmental water samples, anal. methods were developed for the selective detn. of different chem. forms of this element (selenite, selenate, and org. species including trimethylselenonium) using isotope diln. mass spectrometry (IDMS). The species anal. was made possible by means of chromatog. sepn. procedures and an ^{82}Se -enriched selenate, selenite, and trimethylselenonium spike for the isotope diln. process. The total Se concn. was detd. after decompn. of org. compds. with a $\text{HNO}_3/\text{HClO}_4$ mixt. The Se was measured in the mass spectrometer by producing neg. Se- thermal ions for detection. Precise detn. at the parts-per-trillion level was achieved. This new methodol. was applied to different types of natural water samples (groundwater, pond water, river water, moorland lake water) with total Se concns. in the range of 200 pg/g to 15 ng/g. Selenite and selenate were the only detected species in most of the investigated samples, with selenate dominating all except one. In samples with high contents of dissolved org. C, however, different organoselenium compds., including trimethylselenonium ions, were addnl. quantified in the range of 10-95 pg/g. In these cases, the sum of Se species agreed well with the independently detd. total element concn.

L7 ANSWER 58 OF 75 CA COPYRIGHT 1999 ACS
 AN 114:137485 CA
 TI Substoichiometric speciation for inorganic arsenic and methylated arsenic and its application to samples of marine organisms
 AU Jitoh, Fumiharu; Imura, Hisanori; Suzuki, Nobuo
 CS Fac. Sci., Tohoku Univ., Sendai, 980, Japan
 SO Anal. Chim. Acta (1990), 228(1), 85-91 CODEN: ACACAM; ISSN: 0003-2670
 LA English
 AB A substoichiometric isotope-diln. method is described for the detn. of monomethylarsonate, MeAs(V) , and dimethylarsinate, $\text{Me}_2\text{As(V)}$. After the sepn. of MeAs(V) and $\text{Me}_2\text{As(V)}$ by extn. as their iodides into benzene,

these methylated arsenic species are complexed with a substoichiometric amt. of diethyldithiocarbamate in benzene, and the uncomplexed methylarsenic species are removed. The relative std. deviations for the substoichiometric extn. of MeAs(V) and Me₂As(V) are ≤0.5% and 1.1%, resp. This substoichiometric speciation of methylated arsenic together with an earlier substoichiometric method for speciation of inorg. arsenic species was applied to the speciation of arsenic in an acid-digested soln. of a macroalgae sample. It was demonstrated that almost all the arsenic in this soln. was Me₂As(V) even after the digestion with nitric acid.

L7 ANSWER 60 OF 75 CA COPYRIGHT 1999 ACS

AN 113:11836 CA

TI Development of a definitive method for iodine speciation in aquatic systems

AU Reifenhäuser, Christiane; Heumann, Klaus G.

CS Inst. Anorg. Chem., Univ. Regensburg, Regensburg, D-8400, Fed. Rep. Ger.

SO Fresenius' J. Anal. Chem. (1990), 336(7), 559-63 CODEN: FJACES; ISSN: 0937-0633

LA English

AB A method of isotope diln. mass spectrometry was developed to det. I species in aquatic systems (I⁻, IO₃⁻, and 2 organoiodine compds.: one of the org. species can be eluted from a column filled with an anion exchanger resin, the other is retained). The I species were analyzed after diln. with an ¹²⁹I enriched spike and chromatog. sepn. The total I concn. was measured after decompn. of org. compds. by UV irradiation. The total I concn. in river water, water of a pond, moorland lake water differed only slightly and was 2-7 µg/L. In most of the moorland lake water samples only the 2 organoiodine species could be detected. In these samples the concn. of I⁻ and IO₃⁻ was below the detection limit of 0.5 µg/L and 0.1 µg/L, resp. All 4 I species could be detd. in most of the river water samples. Pos. correlations were found for the O content of the water samples and the IO₃⁻ concn. as well as for the redox potential and the anionic organoiodine compd.

L7 ANSWER 63 OF 75 CA COPYRIGHT 1999 ACS

AN 110:141113 CA

TI Negative thermal ionization mass spectrometry of selenium. Part 2. Selenite and selenate species determination in groundwaters by the isotope dilution technique

AU Heumann, Klaus G.; Grosser, Regina

CS Inst. Anorg. Chem., Univ. Regensburg, Regensburg, D-8400, Fed. Rep. Ger.

SO Fresenius' Z. Anal. Chem. (1989), 332(8), 880-3 CODEN: ZACFAU; ISSN: 0016-1152

LA German

AB Selenite and selenate were detd. in groundwaters by isotope diln. mass spectrometry. The anal. uses a ⁸²Se-enriched selenite and selenate spike and chromatog. sepn. of species after the isotope diln. step. In a column filled with DEAE cellulose anion exchanger, selenite was sepd. with 1M HCO₂H, whereas selenate was eluted with 0.1M HNO₃ solns. The mass spectrometric isotope ratio measurement was carried out in a thermal ionization instrument using the formation of Se⁻ thermal ions for detection. Selenite, selenate, and total Se in groundwater samples were detd. in the concn. range of 0.2-20 ng/g with relative std. deviations of 0.5-5%. The selenate concn. was ~10-80 times higher than the corresponding selenite concn. There was always a difference of ~8% between the sum of the selenite and selenate concns. and the total Se concn. which can be attributed to water-sol. selenides and elementary Se, resp.

L7 ANSWER 66 OF 75 CA COPYRIGHT 1999 ACS

AN 109:115746 CA

TI Negative thermal ionization mass spectrometry of selenium. Part 1.
Isotope ratio measurements and determinations in aquatic systems with the
isotope dilution technique

AU Grosser, Regina; Heumann, Klaus G.

CS Inst. Anorg. Chem., Univ. Regensburg, Regensburg, D-8400, Fed. Rep. Ger.

SO Fresenius' Z. Anal. Chem. (1988), 331(3-4), 268-72 CODEN: ZACFAU; ISSN:
0016-1152

LA German

AB Neg. thermal ionization is used to det. the Se isotope ratios in a double-
filament ion source. A thin film of Ba(OH)₂ on the Re ionization filament
is applied to increase the Se- thermal ion current. The Se- ion beam
produced is higher by a factor of ~4 when H₂SeO₃ instead of BaSeO₃ or
Na₂SeO₄ is used. A strong dependence of the ion current on the temp. of
the ionization filament is found showing the max. ion intensity at temps.
of 970-1000°. The different Se isotope ratios of samples with natural
isotopic abundance can be detd. with relative std. deviations of 0.3-0.6%.
This reproducibility is a good basis to improve the accuracy of the Se at.
wt. in the future by a calibrated measurement. An enriched ⁸²Se spike is
used to analyze Se traces in aquatic systems with isotope diln. mass
spectrometry down to the pg/g level. In the concn. range of 4-23 ng/g,
the Se content is detd. with relative std. deviations of 0.1-5%. The
results agree well with those obtained with a hydride generation at.
absorption system. It is shown that the described method of isotope diln.
mass spectrometry dets. the sum of the inorg. species SeO₄²⁻, SeO₃²⁻, and
Se²⁻, but not volatile org. Se compds.

L7 ANSWER 70 OF 75 CA COPYRIGHT 1999 ACS

AN 100:46434 CA

TI Analysis and occurrence of inorganic and organic mercury compounds in
marine and terrestrial animals

AU Harms, U.; Luckas, B.; Lorenzen, W.; Montag, A.

CS Lab. Radiooekol., Bundesforschungsanst. Fischerei, Hamburg, D-2000/55,
Fed. Rep. Ger.

SO Fresenius' Z. Anal. Chem. (1983), 316(6), 600-3 CODEN: ZACFAU; ISSN:
0016-1152

LA German

AB An anal. scheme for the chem. speciation of Hg in biol. material was
developed which included selective redn. and subsequent cold-vapor at.
absorption spectrometry, gas chromatog., and substoichiometric isotope
diln. anal. Contents of total (inorg. plus org.) and org. Hg in muscle
tissue, liver and kidneys of some species of marine and terrestrial
animals are presented. In all cases, liver and kidney had higher total Hg
concns. than muscle tissue. Organically assocd. Hg (methylmercury) was
the predominant chem. form in muscle tissue of all species analyzed.
Significantly lower portions of org. Hg were detected in liver and
kidneys. Reasons for the different distribution of Hg compds. (Hg
species) in the animals analyzed are discussed.

L7 ANSWER 72 OF 75 CA COPYRIGHT 1999 ACS

AN 99:95572 CA

TI Investigation of technetium species in groundwater and migration through
clay columns

AU Bidoglio, G.; Chatt, A.; De Plano, A.; Zorn, F.

CS Jt. Res. Cent., Ispra Establ., Ispra, I-21020, Italy

SO J. Radioanal. Chem. (1983), 79(1), 153-64 CODEN: JRACBN; ISSN: 0022-4081
LA English
AB Speciation of Tc in groundwater was studied for understanding the migration behavior of this radionuclide in deep geol. formations. A combination of free-liq. electromigration, ion exchange, solvent extn., copptn. and dialysis methods was applied. Both oxic and anoxic conditions were employed. Systems studied include leaching of Na borosilicate glass spiked with ^{99}Tc and $^{95\text{m}}\text{Tc}$ followed by its passage through glauconitic sand columns, and dialysis of TcO_2 with groundwater, NaCl , and humic acid solns. Results indicate the presence of the TcO_4^- ion as the dominant species.

L7 ANSWER 75 OF 75 CA COPYRIGHT 1999 ACS
AN 85:82753 CA
TI Isotopic dilution of zinc-65 in Oregon coastal waters
AU Cutshall, Norman H.; Renfro, William C.; Larsen, Ingvar L.
CS Sch. Oceanogr., Oregon State Univ., Corvallis, Oreg., USA
SO Health Phys. (1975), 29(6), 865-9 CODEN: HLTPAO
LA English
AB Specific activity of ^{65}Zn ($^{65}\text{Zn}/\text{Zn}$) obsd. in mussels, *Mytilus californianus*, collected along the Oregon coast is compared to values predicted, based on a simple model for isotopic diln. of ^{65}Zn in the Columbia River. The obsd. values are very similar to those computed from the model. There is no evidence that chem. speciation of Zn in coastal waters affects the ^{65}Zn sp. activity of mussels.

=> log y

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